

Amendment
U.S. Patent Application No. 10/798,333

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

21. (Previously Presented) A process for the removal and causticisation of sodium oxalate and/or sodium sulphate from a Bayer process liquor containing carbonate ions and oxalate and/or sulphate ions, the process comprising the steps of:

- (a) treating the Bayer process liquor to remove carbonate ions by forming carbonate-bearing solids;
- (b) separating the carbonate-bearing solids to form a clarified liquor containing residual carbonate ions and oxalate and/or sulphate ions;
- (c) adding lime to the clarified liquor to remove the residual carbonate ions and form reacted lime solids including the oxalate and/or sulphate ions; and,
- (d) separating the reacted lime solids to form a purified liquor.

22. (Previously Presented) A process as defined in claim 21 wherein the carbonate-bearing solids include carbonate-bearing hydrocalumite and, after step (b), the process comprises a further step of recovering the separated carbonate-bearing hydrocalumite.

23. (Previously Presented) A process as defined in claim 21, wherein step (a) further comprises the step of adding lime.

24. (Previously Presented) A process as defined in claim 21, further comprising the step of enriching the Bayer process liquor with sulphate ions and/or oxalate ions.

25. (Previously Presented) A process as defined in claim 24, wherein the step of enriching is conducted prior to and/or during step (a).

Amendment

U.S. Patent Application No. 10/798,333

26. (Previously Presented) A process as defined in claim 24, wherein the step of enriching is conducted prior to and/or during step (c).

27. (Currently Amended) A process as defined in claim 21, wherein the Bayer process liquor has an $[[S]]$ S concentration prior to step (a) of between 0 and 250 g/L.

28. (Previously Presented) A process as defined in claim 27, wherein the S concentration is less than 150 g/L.

29. (Previously Presented) A process as defined in claim 21, further comprising the step of maintaining the temperature of the Bayer process liquor in step (a) between 20°C and 180°C.

30. (Previously Presented) A process as defined in claim 29, wherein the temperature of the Bayer process liquor in step (a) is maintained between 20°C and the atmospheric boiling point of the Bayer liquor.

31. (Previously Presented) A process as defined in claim 30, wherein the temperature of the Bayer process liquor in step (a) is maintained between 20°C and 90°C.

32. (Previously Presented) A process as defined in claim 31, wherein the temperature of the Bayer process liquor in step (a) is maintained between 50°C and 70°C.

33. (Previously Presented) A process as defined in claim 21, wherein step (c) is conducted at a temperature between 20°C and 140°C.

34. (Previously Presented) A process as defined in claim 33, wherein step (c) is conducted at a temperature between 50°C and 80°C.

Amendment
U.S. Patent Application No. 10/798,333

35. (Previously Presented) A process as defined in claim 21, wherein step (c) is conducted over a residence time of between 15 minutes and 4 hours.

36. (Previously Presented) A process as defined in claim 35, wherein step (c) is conducted over a residence time of between 30 and 120 minutes.

37. (Previously Presented) A process as defined in claim 36, wherein step (c) is conducted over a residence time of between 30 and 60 minutes.

38. (Previously Presented) A process as defined in claim 21, further comprising the step of washing and drying the separated reacted lime solids.

39. (Previously Presented) A process as defined in claim 22, wherein the Bayer liquor includes sulphate ions and the separated reacted lime solids include sulphate-bearing hydrocalumite.

40. (Previously Presented) A process as defined in claim 39, further comprising the step of recovering the sulphate-bearing hydrocalumite after step (d).

41. (Previously Presented) A process as defined in claim 21, wherein the carbonate-bearing solids include calcium carbonate.

42. (Previously Presented) A process as defined in claim 29, further comprising the step of cooling the heated clarified liquor prior to step (c).

43. (Previously Presented) A process as defined in claim 42, wherein the step of cooling the heated clarified liquor is conducted after step (b).

Amendment
U.S. Patent Application No. 10/798,333

44. (Previously Presented) A process as defined in claim 29, wherein the heated clarified liquor is cooled to a temperature between 30°C and 90°C.

45. (Previously Presented) A process as defined in claim 42, wherein the heated clarified liquor is cooled to a temperature between 30°C and 90°C after step (b).

46. (Previously Presented) A process as defined in claim 44, wherein the heated clarified liquor is cooled to a temperature between 50°C and 70°C.

47. (Previously Presented) A process as defined in claim 45, wherein the heated clarified liquor is cooled to a temperature between 50°C and 70°C after step (b).

48. (Previously Presented) A process as defined in claim 30, further comprising the step of cooling the heated clarified liquor prior to step (c).

49. (Previously Presented) A process as defined in claim 48, wherein the step of cooling the heated clarified liquor is conducted after step (b).

50. (Previously Presented) A process as defined in claim 30, wherein the heated clarified liquor is cooled to a temperature between 30°C and 90°C.

51. (Previously Presented) A process as defined in claim 50, wherein the heated clarified liquor is cooled to a temperature between 30°C and 90°C after step (b).

52. (Previously Presented) A process as defined in claim 21, further comprising the step of agitating the Bayer liquor during step (a) and/or step (c).

Amendment**U.S. Patent Application No. 10/798,333**

53. (Previously Presented) A process as defined in claim 40, further comprising the step of recycling the recovered carbonate-bearing hydrocalumite and/or sulphate-bearing hydrocalumite within an alumina refinery.

54. (Previously Presented) A process as defined in claim 40, further comprising the step of recycling the recovered sulphate-bearing hydrocalumite to step (a).